

**ELECTRICAL RESISTANCE SENSOR AND APPARATUS  
FOR MONITORING CORROSION**

ABSTRACT OF THE DISCLOSURE

An apparatus (1) is disclosed for  
5 monitoring the effect on a material of exposure to a  
fluid, and thereby monitoring the effect on a section  
of pipe (9) for carrying the fluid. The apparatus  
comprises a sensor element (51) exposed to the fluid  
and formed as a ring of the material coaxially  
10 mounted within, but electrically insulated from, the  
section of pipe (9). Changes in the electrical  
resistance of the sensor element (51) are monitored.  
Preferably, the apparatus also comprises a reference  
element (31) electrically insulated from the pipe  
15 (9), electrically connected in series to the sensor  
element (51) and protected from exposure to the  
fluid. The elements may both be made from the same  
material as the pipe (9) and, as they are contained  
within it, experience the same temperature and  
20 pressure variations as the pipe (9). In this manner a  
change in the resistance of the sensor element (51)  
caused by corrosion/erosion by the fluid accurately  
indicates the degree of corrosion/erosion of the pipe  
(9) carrying the fluid.



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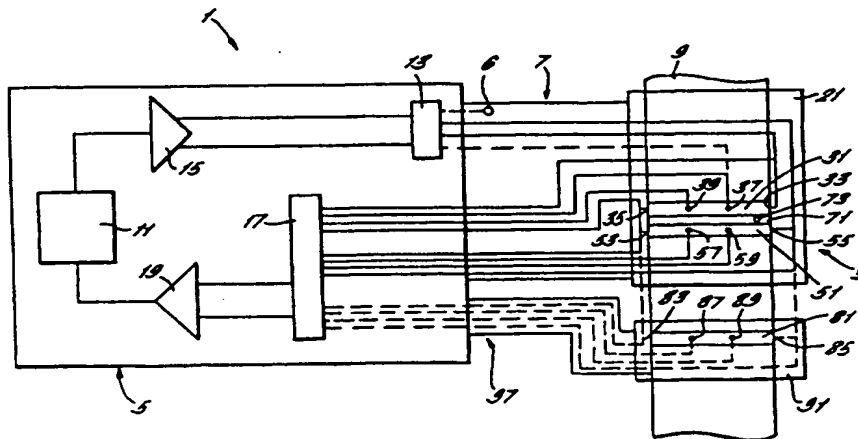
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## (57) Abstract

An apparatus (1) is disclosed for monitoring the effect on a material of exposure to a fluid, and thereby monitoring the effect on a section of pipe (9) for carrying the fluid. The apparatus comprises a sensor element (51) exposed to the fluid and formed as a ring of the material coaxially mounted within, but electrically insulated from, the section of pipe (9). Changes in the electrical resistance of the sensor element (51) are monitored. Preferably, the apparatus also comprises a reference element (31) electrically insulated from the pipe (9), electrically connected in series to the sensor element (51) and protected from exposure to the fluid. The elements may both be made from the same material as the pipe (9) and, as they are contained within it, experience the same temperature and pressure variations as the pipe (9). In this manner a change in the resistance of the sensor element (51) caused by corrosion/erosion by the fluid accurately indicates the degree of corrosion/erosion of the pipe (9) carrying the fluid.